Transgender Health in Massachusetts: Results From a Household Probability Sample of Adults

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Despite higher rates of unemployment and poverty among transgender adults (n=131; 0.5% weighted) than among nontransgender adults (n=28 045) in our population-based Massachusetts household sample, few health differences were observed between transgender and nontransgender adults. Transgender adults who are stably housed and participated in a telephone health survey may represent the healthiest segment of the transgender population. Our findings demonstrate a need for diverse sampling approaches to monitor transgender health, including adding transgender measures to population-based surveys, and further highlight economic inequities that warrant intervention. (*Am J Public Health.* 2012;102:118–122. doi:10.2105/AJPH.2011.300315)

Incomplete knowledge about the health of transgender people, individuals with gender identities not fully congruent with their sex at birth,[1] hinders inclusion of transgender health on the US public health agenda. Nearly all published research on transgender health in the United States has relied on convenience samples, assembled for urban HIV needs assessments, because the majority of health surveillance surveys have not included measures that permit identification of transgender respondents. Transgender people in these studies reported elevated rates of unemployment and poverty,[2–5] violence victimization,[2,3,6–10] HIV infection,[2–5,7,10] mental health problems,[2,3,9,10] and barriers to health care access[3–5,10–13] compared with the general population. Although these findings clearly indicate that some segment of the transgender population is in dire need of intervention, the extent to which they are generalizable to a broader transgender population is unknown, and this limits their influence on public health planning. Our study fills an important gap in the literature by providing estimates of several health indicators and socioeconomic status by transgender status in a representative household sample.

METHODS

Between 2007 and 2009, survey participants aged 18 to 64 years in the Massachusetts Behavioral Risk Factor Surveillance System (MA-BRFSS; N=28 662) were asked: "Some people describe themselves as transgender when they experience a different gender identity from their sex at birth. For example, a person born into a male body, but who feels female or lives as a woman. Do you consider yourself to be transgender?" A more detailed definition of the term transgender was read to those who expressed confusion.[14]

We used participant-reported annual household income range and size to create an ordinal measure of percentage of poverty. We recoded annual household income to the midpoint for each income range or to the 80th percentile of annual family income ($112 540 to $113 205)[15] for those who selected the highest income category (≥$75 000). We divided recoded income by size-specific poverty thresholds[16] to obtain percentage of poverty (i.e., the income-to-needs ratio according to US census criteria).[17]

We used SUDAAN version 10.0.1 (RTI International, Research Triangle Park, NC) to fit design-adjusted multivariable logistic regression models with BRFSS sampling weights provided by the state of Massachusetts. We multiply imputed missing sociodemographic item values with the SAS version 9.2 MI procedure (SAS Institute, Cary, NC). We restricted the analytic sample to 28 176 participants who answered yes or no to the transgender question (excluding n=364, 1.0% weighted who declined to respond and n=122, 0.4% who "didn't know"). Tests of statistical association were 2-tailed (α=0.05).

RESULTS

Transgender respondents (n=131; 0.5%; 95% confidence interval [CI]=0.3%, 0.6%) were somewhat younger and more likely to be Hispanic than were nontransgender respondents (Table 1).

Transgender adults were more likely (odds ratio [OR]=3.2; 95% CI=1.4, 7.2) to be unemployed and to be living at less than or equal to 100% poverty (OR=3.1; 95% CI=1.1, 8.3) than nontransgender adults (Table 2), with adjustment for age and race/ethnicity. The magnitude of the poverty disparity was reduced by 29% (OR=2.1; 95% CI=0.63, 7.64) when we added employment status to the model. Transgender adults were less likely to be overweight (OR=0.4; 95%=0.2, 0.8), but more likely to smoke (OR=2.7; 95% CI=1.3, 5.6) compared with nontransgender peers.

DISCUSSION

As expected, transgender adults in our household sample were healthier than those recruited for community-based HIV needs assessment studies, yet the relative dearth of health differences was surprising if one considers the disproportionate rates of unemployment and poverty among the transgender adults in our study—characteristics that are typically associated with poor health.[18] Possible explanations for the limited number of health inequities include

1. selection bias,
2. misclassification bias,
3. unexamined effect modification,
4. limited context-specific variability in outcomes, and
5. insufficient breadth of outcomes.

First, the MA-BRFSS does not sample institutions (e.g., homeless shelters) and excludes adults who have lived at a residence for less than 1 month.[19] If transgender people face discrimination-related obstacles to acquiring stable housing and are overrepresented among

TABLE 1—Weighted Demographic Characteristics of Participants Aged 18 to 64 Years, by Transgender Status: Massachusetts BRFSS, 2007–2009

Characteristic	Transgender (n = 131), % (95% CI)	Nontransgender (n = 28 045), % (95% CI)	Wald $\chi^2_{(df)}$ *P*
Age, y			$0.88_{(2)}$ .4
18–33	44.4 (28.5, 61.6)	32.2 (31.1, 33.1)	
34–49	32.2 (19.2, 48.6)	37.9 (37.0, 38.8)	
50–64	23.4 (14.6, 35.4)	29.9 (29.2, 30.7)	
Gender[a]			$0.13_{(1)}$ .72
Male-sounding	45.9 (30.0, 62.3)	49.0 (48.0, 50.0)	
Female-sounding	54.1 (37.3, 70.0)	51.0 (50.0, 52.0)	
Race/ethnicity			$5.94_{(3)}$ <.01
White, non-Hispanic	61.7 (43.0, 77.5)	80.2 (79.4, 81.1)	
Black, non-Hispanic	4.9 (2.1, 11.2)	5.4 (5.0, 5.9)	
Hispanic	32.4 (16.9, 52.9)	9.0 (8.4, 9.7)	
Asian, American Indian, Alaska and Hawaii natives and Pacific Islanders	1.0 (0.3, 2.8)	5.3 (4.8, 5.8)	
Survey language			$0.26_{(1)}$ .61
English	94.6 (85.7, 98.0)	95.9 (95.5, 96.4)	
Spanish or Portuguese	5.4 (2.0, 14.3)	4.1 (3.6, 4.5)	
Relationship status			$2.12_{(3)}$ .1
Married	36.6 (24.1, 51.2)	60.4 (59.4, 61.4)	
Formerly married	25.7 (12.7, 45.2)	10.8 (10.4, 11.3)	
Never married	26.8 (13.7, 45.6)	23.5 (22.5, 24.6)	
Member of an unmarried couple	10.9 (4.0, 26.5)	5.3 (4.8, 5.8)	

Note. BRFSS = Behavioral Risk Factor Surveillance System; CI = confidence interval. The sample size was n = 28 176. All CIs were design-adjusted.
[a]Respondent gender was recorded by survey interviewers based on the sound of the respondent's voice and clarified "if necessary."

the marginally housed,[20] then our sample may contain the best-resourced, healthiest among the transgender population. Consequently, comparisons conducted within household samples such as ours may underestimate true transgender–nontransgender health differences in the population.

Second, misclassification of nontransgender respondents as transgender may have diluted the true association between transgender status and health. Although this is possible, our measure included an explicit definition of the term transgender and the proportion of respondents who endorsed a transgender identity on the 2007–2009 MA-BRFSS (0.05%) is comparable to that observed on the aggregated 2000, 2001, 2004 Vermont BRFSS (0.9%; written communication, J. Brosseau, program coordinator, Vermont Department of Public Health, December 30, 2010) and 2001, 2003, 2005, 2006 Boston BRFSS (0.6%; oral communication, D. Dooley, senior researcher, Boston Public Health Commission, January 7, 2011). Nevertheless, the question that we used should be cognitively tested.

Third, research suggests that the socioeconomic and health status of transgender women (born male, identify as women) and that of transgender men may differ.[2,10] Despite the fact that voice-based classifications are poor proxies for self-reported gender identity and birth sex, the method used by the BRFSS, we conducted posthoc stratified analyses. (The BRFSS interviewers are advised to ask the gender of a potential BRFSS participant during the household screening "if necessary"; however, data are not recorded about whether gender is asked or assumed.) Our results showed heterogeneity in health within the transgender population that disfavors male-sounding respondents. We do not know which subgroup(s) of transgender people were classified as male-sounding; however, our results indicate a need for a self-report birth sex measure and multiple transgender response options (male-to-female, female-to-male, and gender variant) on the BRFSS. We also do not know to what extent the transgender respondents in our sample may have physically transitioned (altered their bodies through hormone use or other medical intervention), which may impact their health and well-being.[21]

Fourth, near universal access to health care in Massachusetts, starting July 2007,[22,23] may have partially offset the hazards of unemployment and poverty. The transgender adults in our sample reported comparable access to health insurance and more regular medical check-ups than their nontransgender counterparts. Regular health care may be motivated by the World Professional Association Transgender Health Standards of Care.[24] Fifth, statistical power limitations precluded exploration of differences in some health domains (e.g., victimization) that were not assessed each year of all survey respondents.

Replication of our findings in other household samples is needed; however, smoking, which was also more prevalent among transgender adults in a population-based sample of lesbian, gay, bisexual, and transgender California adults,[25] and employment and economic inequities merit immediate attention. Transgender adults in our study and others[20,26] were disproportionately unemployed and living in poverty despite average or better educational achievement. Employment discrimination was recently documented in New York's retail sector by using audit-testing methods to manipulate transgender status,[27] corroborating self-reported data on gender-based discrimination in hiring and at work.[20] Collectively, these findings indicate that nondiscrimination protections should be extended to transgender people in Massachusetts and beyond.[28] Transgender measures should be added to large

TABLE 2—Weighted Socioeconomic and Health Characteristics of Participants Aged 18 to 64 Years, by Transgender Status: Massachusetts BRFSS 2007–2009

Characteristics	No.[a]	Transgender (n = 131), % (95% CI)	Nontransgender (n = 28 045), % (95% CI)	Full Sample Transgender vs Nontransgender		Male Sounding Transgender vs Nontransgender		Female Sounding Transgender vs Nontransgender	
				OR (95% CI)	Wald $\chi^2_{(df)}$ *P*	OR (95% CI)	Wald $\chi^2_{(df)}$ *P*	OR (95% CI)	Wald $\chi^2_{(df)}$ *P*
Socioeconomic status									
Any college education	28 176	52.5 (36.2, 68.3)	70.5 (69.5, 71.4)	0.64 (0.30, 1.34)	$1.41_{(1)}$ .24	0.61 (0.14, 2.74)	$0.41_{(1)}$ .52	0.61 (0.31, 1.20)	$2.03_{(1)}$ .15
Employment status	28 176				$8.31_{(2)}$ .02		$9.44_{(2)}$ .01		$3.20_{(2)}$ .2
Unemployed		32.9 (18.4, 51.7)	11.9 (11.3, 12.5)	3.21 (1.44, 7.18)		4.11 (1.20, 14.03)		2.46 (0.91, 6.64)	
Not in workforce		11.3 (4.2, 26.9)	13.0 (12.2, 13.7)	1.03 (0.36, 2.98)		0.22 (0.04, 1.37)		1.26 (0.42, 3.82)	
Employed		55.7 (38.7, 71.5)	75.2 (74.2, 76.0)	1.00		1.00		1.00	
Percentage poverty[b]	28 176				$5.35_{(2)}$ .07		$8.92_{(2)}$ .01		$1.45_{(2)}$ .49
0%–99%		31.2 (13.9, 56.1)	9.3 (8.5, 10.0)	3.07 (1.13, 8.29)		6.14 (1.66, 22.77)		1.83 (0.52, 6.42)	
100%–199%		20.9 (7.0, 48.3)	17.9 (17.0, 18.8)	1.31 (0.40, 4.27)		2.40 (0.48, 11.98)		0.83 (0.25, 2.72)	
≥200%		47.9 (30.2, 66.1)	72.8 (71.8, 73.8)	1.00		1.00			
Health care access									
No health insurance	28 125	13.8 (4.6, 34.9)	5.6 (5.1, 6.2)	1.57 (0.41, 5.98)	$0.44_{(1)}$ .51	2.11 (0.31, 14.20)	$0.59_{(1)}$ .44	0.67 (0.22, 1.99)	$0.53_{(1)}$ .47
Public health insurance (Medicaid/Medicare) vs private or other	23 327	22.8 (12.4, 38.0)	13.8 (13.0, 14.6)	1.25 (0.33, 4.73)	$0.11_{(1)}$ .74	0.89 (0.12, 6.89)	$0.01_{(1)}$ .92	1.67 (0.62, 4.50)	$1.02_{(1)}$ .31
No regular provider	28 117	7.7 (3.5, 16.3)	11.7 (11.0, 12.5)	0.38 (0.13, 1.09)	$3.24_{(1)}$ .07	0.15 (0.03, 0.63)	$6.69_{(1)}$ .01	0.88 (0.24, 3.25)	$0.04_{(1)}$ .84
Did not see doctor because of cost in past 12 mo	28 130	6.5 (2.8, 14.2)	7.4 (6.9, 7.9)	0.61 (0.23, 1.61)	$1.01_{(1)}$ .32	0.72 (0.18, 2.84)	$0.22_{(1)}$ .64	0.45 (0.10, 2.13)	$1.01_{(1)}$ .31
No checkup in past 12 mo	25 021	14.6 (8.2, 24.8)	25.2 (24.3, 26.2)	0.51 (0.26, 1.01)	$3.69_{(1)}$ .05	0.23 (0.08, 0.64)	$7.75_{(1)}$ .01	0.95 (0.40, 2.24)	$0.01_{(1)}$ .91
General health									
Fair or poor self-rated health	28 098	11.9 (6.2, 21.7)	9.8 (9.3, 10.3)	1.0 (0.46, 2.15)	$0.00_{(1)}$ > .99	0.70 (0.24, 2.08)	$0.40_{(1)}$ .53	1.38 (0.55, 3.45)	$0.48_{(1)}$ .49
Activity limitation because of disability	27 898	22.5 (12.2, 37.6)	15.5 (14.9, 16.2)	1.69 (0.80, 3.60)	$1.86_{(1)}$ .17	2.14 (0.60, 7.64)	$1.38_{(1)}$ .24	1.35 (0.56, 3.22)	$0.45_{(1)}$ .5
≥15 d poor physical health in past 30 d	27 823	10.2 (3.3, 27.4)	7.2 (6.8, 7.7)	1.47 (0.42, 5.10)	$0.37_{(1)}$ .54	0.97 (0.34, 2.75)	$0.00_{(1)}$ .95	1.90 (0.37, 9.91)	$0.59_{(1)}$ .44
Weight[b,c]	26 492				$14.13_{(3)}$ < .001		$10.30_{(3)}$ .02		$4.65_{(3)}$ .2
Underweight		6.6 (1.1, 30.4)	1.9 (1.6, 2.2)	2.77 (0.47, 16.26)		0.77 (0.06, 9.24)		3.52 (0.51, 24.29)	
Normal		46.3 (30.0, 63.5)	40.9 (39.9, 42.0)	1.00		1.00		1.00	
Overweight		15.1 (8.6, 25.3)	35.6 (34.6, 36.6)	0.37 (0.18, 0.76)		0.28 (0.08, 1.07)		0.51 (0.22, 1.19)	
Obese		32.0 (17.7, 50.7)	21.6 (20.8, 22.4)	1.21 (0.48, 3.04)		1.39 (0.26 7.36)		1.02 (0.42, 2.45)	

Continued

TABLE 2—Continued

No exercise in past 30 d	28 162	13.9 (7.8, 23.6)	19.3 (18.5, 20.1)	0.53 (0.26, 1.07)	$3.11_{(1)}$ .08	0.34 (0.11, 1.01)	$3.75_{(1)}$ .05	0.74 (0.32, 1.68)	$0.53_{(1)}$ .47
HIV screening									
Lifetime test	26 507	42.2 (27.2, 58.7)	42.1 (41.1, 43.1)	0.91 (0.43, 1.94)	$0.06_{(1)}$ .81	1.16 (0.31, 4.33)	$0.05_{(1)}$ .82	0.71 (0.30, 1.68)	$0.60_{(1)}$ .44
HIV test in past year	23 882	16.8 (7.0, 35.0)	9.8 (9.1, 10.5)	1.73 (0.57, 5.28)	$0.93_{(1)}$ .34	3.17 (0.61, 16.57)	$1.87_{(1)}$ .17	0.82 (0.18, 3.69)	$0.07_{(1)}$ .8
Chronic health conditions									
Diabetes	28 148	6.6 (2.7, 15.2)	5.2 (4.8, 5.5)	1.53 (0.62, 3.78)	$0.85_{(1)}$ .36	2.74 (0.95, 7.91)	$3.46_{(1)}$ .06	0.40 (0.11, 1.43)	$1.99_{(1)}$ .16
Heart disease	28 064	2.5 (0.7, 8.9)	1.9 (1.7, 2.2)	1.51 (0.43, 5.30)	$0.41_{(1)}$ .52	2.57 (0.72, 9.18)	$2.11_{(1)}$ .15	1.00 (0.64, 1.56)	$0.00_{(1)}$ > .99
Asthma	16 972	17.6 (8.5, 33.0)	15.7 (14.8, 16.6)	1.03 (0.43, 2.46)	$0.00_{(1)}$ .95	0.66 (0.16, 2.71)	$0.32_{(1)}$ .57	1.40 (0.48, 4.04)	$0.38_{(1)}$ .54
Substance use									
Current smoker	28 056	36.2 (21.3, 54.3)	17.3 (16.6, 18.1)	2.70 (1.31, 5.57)	$7.19_{(1)}$ .01	3.89 (1.32, 11.52)	$6.04_{(1)}$ .01	1.94 (0.75, 5.00)	$1.88_{(1)}$ .17
Binge drinking, past 30 d	27 621	25.1 (12.0, 45.4)	20.7 (19.9, 21.7)	1.24 (0.49, 3.16)	$0.21_{(1)}$ .65	1.83 (0.55, 6.10)	$0.97_{(1)}$ .32	0.84 (0.18, 3.86)	$0.05_{(1)}$ .82
Mental health and quality of life									
≥ 15 d poor mental health in past 30 d	27 784	14.3 (4.8, 35.7)	9.8 (9.2, 10.4)	1.44 (0.45, 4.63)	$0.37_{(1)}$ .54	3.23 (0.68, 15.49)	$2.16_{(1)}$ .14	0.48 (0.20, 1.12)	$2.91_{(1)}$ .09
Get the emotional support you need never to sometimes vs usually or always	26 719	30.4 (15.8, 50.3)	18.2 (17.4, 19.0)	1.87 (0.89, 3.91)	$2.73_{(1)}$ .1	2.50 (0.85, 7.40)	$2.76_{(1)}$ .1	1.40 (0.58, 3.40)	$0.56_{(1)}$ .46
Dissatisfied with your life	26 810	14.4 (5.8, 31.2)	5.6 (5.2, 6.1)	2.75 (0.98, 7.70)	$3.73_{(1)}$ .05	6.18 (1.69, 22.52)	$7.61_{(1)}$ .01	0.51 (0.14, 1.88)	$1.01_{(1)}$ .31

Note. BRFSS = Behavioral Risk Factor Surveillance System; CI = confidence interval; OR = odds ratio. The sample size was n = 28 176. Odds ratios were adjusted for age and race/ethnicity. All CIs were design-adjusted.
[a]Number of participants who answered the survey item in the aggregate sample.
[b]Federal poverty thresholds set by the US Census Bureau for each year (2007–2009).[16]
[c]Mutually exclusive weight groups were created based on Centers for Disease Control and Prevention guidelines for body mass index (defined as weight in kilograms divided by the square of height in meters).

population-based surveys, and other approaches[29] to draw representative samples of transgender people investigated, to assemble a complete picture of transgender health, and to monitor the socioeconomic status of this socially marginalized group. ■

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Contributors

K.J. Conron and S.J. Landers conceptualized the study. K.J. Conron analyzed the data and wrote the final draft of the article. All authors interpreted findings, contributed ideas, and participated in writing the article.

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Human Participant Protection

Approval from an institutional review board was not needed; however, a data use agreement was obtained from the MDPH to use the MA-BRFSS data for this study.

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A Decade of Spore-Forming Bacterial Infections Among European Injecting Drug Users: Pronounced Regional Variation

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The recent anthrax outbreak among injecting drug users (IDUs) in Europe has highlighted an ongoing problem with severe illness resulting from spore-forming bacteria in IDUs. We collated the numbers of cases of 4 bacterial illnesses (botulism, tetanus, *Clostridium novyi*, and anthrax) in European IDUs for 2000 to 2009 and calculated population rates. Six countries reported 367 cases; rates varied from 0.03 to 7.54 per million people. Most cases (92%) were reported from 3 neighboring countries: Ireland, Norway, and the United Kingdom. This geographic variation needs investigation. (*Am J Public Health.* 2012;102:122–125. doi:10.2105/AJPH.2011.300314)

The emergence of anthrax among injecting drug users (IDUs), mostly of heroin, in Scotland in 2009[1] constituted the second major cluster of severe bacterial illness among IDUs in the country in a decade. In 2000 and 2001, an outbreak of *Clostridium novyi* affected IDUs across Great Britain and Ireland,[2,3] with the majority of cases observed in Scotland. Since then, there have been ongoing reports of illness and death among IDUs taking heroin in the United Kingdom. These cases have been associated with a range of spore-forming bacteria, with wound botulism and tetanus cases continuing to occur since being first reported in the early